IN THE CLAIMS:

Claims 59 - 67 have been added.

1. (original) An optical disk recording method for performing recording of data on an optical disk by controlling an irradiation time (n + k)T of a writing optical beam to form a pit length corresponding to the data, where

T: a time corresponding to a unit pit length;

n: a multiple number (integer number) of the pit length to be formed relative to the unit pit length; and

k: a correction quantity

wherein the method comprises the steps of:

recording data while varying a linear velocity multiplication factor of the optical disk;

increasing a power of the writing optical beam as the linear velocity multiplication factor rises;

changing a value of the correction quantity k in accordance with the linear velocity multiplication factor when the same is less than a predetermined critical linear velocity multiplication factor; and

fixing a value of the correction quantity k when the linear velocity multiplication factor is not less than the predetermined critical linear velocity multiplication factor.

2. (original) The optical disk recording method according to claim 1, wherein the predetermined critical linear velocity multiplication factor is set to eight times as much as a nominal standard linear velocity of the optical disk.

3. (original) The optical disk recording method according to claim 1, wherein the

step of recording records the data while varying the linear velocity multiplication factor through a variable range in accordance with a radial position of the writing optical beam on the optical disk, such that the critical linear velocity multiplication factor is predetermined in the middle of the variable range of the linear velocity multiplication factor.

4. (original) The optical disk recording method according to claims 3, wherein the optical disk is rotated at a constant angular speed for recording the data such that the linear velocity multiplication factor is controlled to vary in accordance with a radial position of the writing optical beam on the optical disk.

5. (original) The optical disk recording method according to claim 4, further comprising the step of fixing the variable linear velocity multiplication factor after the same reaches a predetermined level which is determined by an angular rotation speed of the optical disk and time information read from a wobble of the optical disk, thereby the recording being performed with the fixed linear velocity multiplication factor.

6. (original) An optical disk recording method for performing recording of data with a variable linear velocity multiplication factor in accordance with a radial position of an irradiation optical beam on an optical disk, the method comprising:

carrying out a test recording before starting an actual recording at a plurality of test linear velocity multiplication factors lower than a variable range of an actual linear velocity multiplication factor used in the actual recording so as to obtain an appropriate writing power of the irradiation optical beam for each of the test linear velocity multiplication factors;

setting a characteristic of an appropriate writing power in function of the radial

position of the irradiation optical beam for the actual linear velocity multiplication factor based on the appropriate writing powers obtained for each of the test linear velocity multiplication factors; and

carrying out the actual recording such that an appropriate writing power of the irradiation optical beam is calculated based on the set characteristic for the actual linear velocity multiplication factor in accordance with the radial position of the irradiation optical beam.

7. (original) The optical disk recording method according to claim 6, wherein the step of setting sets the characteristic in the form of a linear function or a quadratic or higher-order function.

8. (original) The optical disk recording method according to claims 6, wherein the optical disk is rotated at a constant angular speed for recording the data such that the linear velocity multiplication factor is controlled to vary in accordance with a radial position of the irradiation optical beam on the optical disk.

9. (original) The optical disk recording method according to claim 8, further comprising the step of fixing the variable linear velocity multiplication factor after the same reaches a predetermined level which is determined by an angular rotation speed of the optical disk and time information read from a wobble of the optical disk, thereby the recording being performed with the fixed linear velocity multiplication factor.

10. (original) An optical disk recording method for performing recording of data at a variable linear velocity multiplication factor in accordance with a radial position of an irradiation optical beam on an optical disk, the method comprising the steps of:

carrying out a test recording before starting an actual recording at a first linear

velocity multiplication factor within a variable range of an actual linear velocity multiplication factor used in the actual recording and at a second linear velocity multiplication factor below the variable range of the actual linear velocity multiplication factor so as to obtain an appropriate writing power of the irradiation optical beam for each of the first and second linear velocity multiplication factors;

setting a characteristic of an appropriate writing power in function of the radial position of the irradiation optical beam for the actual linear velocity multiplication factor based on the appropriate writing powers obtained for each of the first and second linear velocity multiplication factors; and

carrying out the actual recording such that an appropriate writing power of the irradiation optical beam is calculated based on the set characteristic for the actual linear velocity multiplication factor in accordance with the radial position of the irradiation optical beam.

11. (original) The optical disk recording method according to claim 10, wherein the step of setting sets the characteristic in the form of a linear function or a quadratic or higher-order function.

12. (original) The optical disk recording method according to claim 10, wherein the optical disk is rotated at a constant angular speed for recording the data such that the linear velocity multiplication factor is controlled to vary in accordance with a radial position of the irradiation optical beam on the optical disk.

13. (original) The optical disk recording method according to claim 12, further comprising the step of fixing the variable linear velocity multiplication factor after the same reaches a predetermined level which is determined by an angular rotation speed

of the optical disk and time information read from a wobble of the optical disk, thereby the recording being performed with the fixed linear velocity multiplication factor.

14. (original) An optical disk recording method for performing recording of data at a variable linear velocity multiplication factor in accordance with a radial position of a irradiation optical beam on an optical disk, the method comprising the steps of:

performing an actual recording with a variable writing power $y = ax + b$ of the irradiation optical beam in accordance with a linear velocity multiplication factor x where the constant a is determined to a fixed value according to a type of the optical disk;

performing a test recording before starting the actual recording such that the test recording is carried out with a test linear velocity multiplication factor to obtain an appropriate writing power of the irradiation optical beam; and

setting the constant b by solving the function $y = ax + b$ with using the results of the test recording where y = the appropriate writing power and x = the test linear velocity multiplication factor, whereby the actual recording can be performed with an appropriate writing power y calculated based on the function $y = ax + b$ having the set constants a and b.

15. (original) The optical disk recording method according to claim 14, wherein the optical disk is rotated at a constant angular speed for recording the data such that the linear velocity multiplication factor is controlled to vary in accordance with a radial position of the irradiation optical beam on the optical disk.

16. (original) The optical disk recording method according to claim 15, further comprising the step of fixing the variable linear velocity multiplication factor after the same reaches a predetermined level which is determined by an angular rotation speed

of the optical disk and time information read from a wobble of the optical disk, thereby the recording being performed with the fixed linear velocity multiplication factor.

17. (original) An optical disk recording method for performing recording of data at a variable linear velocity multiplication factor in accordance with a radial position of a irradiation optical beam on an optical disk, the method comprising the steps of:

performing an actual recording with a variable writing power $y = ax + b$ of the irradiation optical beam in accordance with a linear velocity multiplication factor x where the constant a is set to a fixed value according to a type of the optical disk;

performing a test recording before starting the actual recording such that the test recording is carried out at a plurality of test linear velocity multiplication factors to obtain an appropriate writing power of the irradiation optical beam at each of the test linear velocity multiplication factors; and

setting the constant b by solving the function $y = ax + b$ with using the results of the test recording while minimizing a sum of squares of errors of the obtained appropriate writing powers, whereby the actual recording can be performed with an appropriate writing power y calculated based on the function $y = ax + b$ having the set constants a and b.

18. (original) The optical disk recording method according to claim 17, wherein the optical disk is rotated at a constant angular speed for recording the data such that the linear velocity multiplication factor is controlled to vary in accordance with a radial position of the irradiation optical beam on the optical disk.

19. (original) The optical disk recording method according to claim 18, further comprising the step of fixing the variable linear velocity multiplication factor after the

same reaches a predetermined level which is determined by an angular rotation speed of the optical disk and time information read from a wobble of the optical disk, thereby the recording being performed with the fixed linear velocity multiplication factor.

20. (original) An optical disk recording method for performing recording of data at a variable linear velocity multiplication factor in accordance with a radial position of a irradiation optical beam on an optical disk, the method comprising the steps of:

performing an actual recording with a variable writing power $y = ax2 + bx + c$ of the irradiation optical beam in accordance with a linear velocity multiplication factor x where the constants a and b are determined to a fixed value according to a type of the optical disk;

performing a test recording before starting the actual recording such that the test recording is carried out with a test linear velocity multiplication factor to obtain an appropriate writing power of the irradiation optical beam; and

setting the constant c by solving the function $y = ax2 + bx + c$ with using the results of the test recording where y = the obtained appropriate writing power and x = the test linear velocity multiplication factor, whereby the actual recording can be performed with an appropriate writing power y calculated based on the function $y = ax2 + bx + c$ having the set constants a, b and c.

21. (original) The optical disk recording method according to claim 20, wherein the optical disk is rotated at a constant angular speed for recording the data such that the linear velocity multiplication factor is controlled to vary in accordance with a radial position of the irradiation optical beam on the optical disk.

22. (original) The optical disk recording method according to claim 21, further

comprising the step of fixing the variable linear velocity multiplication factor after the same reaches a predetermined level which is determined by an angular rotation speed of the optical disk and time information read from a wobble of the optical disk, thereby the recording is performed with the fixed linear velocity multiplication factor.

23. (original) An optical disk recording method for performing recording of data at a variable linear velocity multiplication factor in accordance with a radial position of an irradiation optical beam on an optical disk, the method comprising the steps of:

performing an actual recording with a variable writing power y = ax2 + bx + c of the irradiation optical beam in accordance with a linear velocity multiplication factor x of the optical disk where the constants a and b are set to a fixed value according to a type of the optical disk;

performing a test recording before starting the actual recording such that the test recording is carried out at a plurality of test linear velocity multiplication factors to obtain an appropriate writing power of the irradiation optical beam at each of the test linear velocity multiplication factors; and

setting the constant c by solving the function y = ax2 + bx + c with using the results of the test recording while minimizing a sum of squares of errors of the obtained appropriate writing powers, whereby the actual recording can be performed with an appropriate writing power y calculated based on the function y = ax2 + bx + c having the set constants a, b and c.

24. (original) The optical disk recording method according to claim 23, wherein the optical disk is rotated at a constant angular speed for recording the data such that the linear velocity multiplication factor is controlled to vary in accordance with a radial

position of the irradiation optical beam on the optical disk.

25. (original) The optical disk recording method according to claim 24, further comprising the step of fixing the variable linear velocity multiplication factor after the same reaches a predetermined level which is determined by an angular rotation speed of the optical disk and time information read from a wobble of the optical disk, thereby the recording is performed with the fixed linear velocity multiplication factor.

26. (original) An optical disk recording apparatus comprising:

a disk servo that is provided for driving an optical disk to rotate;

an optical pickup that is provided for performing recording and reproducing of data by irradiating the optical disk with an optical beam;

an optical power control section that is provided for controlling a power of the optical beam irradiated from the optical pickup;

a strategy section that is provided for controlling an irradiation time of a writing optical beam in accordance with a pit length to be formed to (n + k)T, where T is a time corresponding to a unit pit length, n is a multiple number (integer number) of the pit length to be formed relative to the unit pit length, and k is a correction quantity;

a storage section that is provided for storing therein a first characteristic that a writing power of the optical beam is increased as a linear velocity multiplication factor of the optical disk is raised, and for storing therein a second characteristic that the correction quantity k varies in accordance with the linear velocity multiplication factor when the same is less than a predetermined critical linear velocity multiplication factor while the correction quantity k is fixed when the linear velocity multiplication factor is not less than the predetermined critical velocity multiplication factor; and

a system control section that instructs the writing power of the optical beam to the optical power control section based on the first characteristic of the writing power of the optical beam stored in the storage section in accordance with the linear velocity multiplication factor at the time of recording data on the optical disk, and that instructs the correction quantity k to the strategy section based on the second characteristic of the correction quantity k stored in the storage section.

27. (original) The optical disk recording apparatus according to claim 26, wherein the storage section stores therein the second characteristic of the correction quantity k in function of the linear velocity multiplication factor in accordance with a type of the optical disk, and the system control section discriminates the type of the optical disk and instructs the correction quantity k to the strategy section based on the second characteristic corresponding to the discriminated type of the optical disk among various second characteristics of correction quantity k stored in the storage section.

28. (original) The optical disk recording apparatus according to claim 26, wherein the system control section issues a command for driving the disk servo by a constant angular velocity control on an inner peripheral side of the optical disk when a radial position of the optical beam is inside a border position, and for driving the disk servo by a constant linear velocity control on an outer peripheral side of the optical disk with a final linear velocity multiplication factor used in the constant angular velocity control when a radial position of the optical beam is outside the border position.

29. (original) The optical disk recording apparatus according to claim 28, further comprising a time information reading section that is provided for reading time information from a wobble of the optical disk, and the system control section calculates

a linear velocity of the optical disk based on a rotation speed of the optical disk under the constant angular velocity control and the time information read from the wobble of the optical disk, and performs the constant linear velocity control on the outer peripheral side to execute recording of the data after the calculated linear velocity reaches a predetermined value.

30. (original) An optical disk recording apparatus comprising:

a disk servo that is provided for driving an optical disk to rotate;

an optical pickup that is provided for performing recording of data by irradiating an optical beam on the optical beam and reproducing of data in the form of a reproduction signal;

an optical power control section that is provided for controlling a power of the optical beam irradiated from the optical pickup;

a signal quality level detection section that is provided for calculating a predetermined parameter concerning a quality level of the reproduction signal based on the reproduction signal reproduced by the optical pickup; and

a system control section that performs a test recording with a plurality of test linear velocity multiplication factors of the optical disk less than a variable range of an actual linear velocity multiplication factor used in an actual recording within a predetermined test area of the optical disk before the actual recording, then obtains an appropriate writing optical power for each of the test linear velocity multiplication factors based on the reproduction signal in the test recording, sets a characteristic of an appropriate writing power relative to a linear velocity multiplication factor based on the appropriate writing powers obtained for each of the linear velocity multiplication factors,

and calculates an appropriate writing power based on the characteristic in accordance with a linear velocity multiplication factor dependent on a radial position of the writing optical beam, thereby instructing the calculated writing optical power to the optical power control section in the actual recording.

31. (original) The optical disk recording apparatus according to claim 30, wherein the system control section issues a command for driving the disk servo by a constant angular velocity control on an inner peripheral side of the optical disk when a radial position of the optical beam is inside a border position, and for driving the disk servo by a constant linear velocity control on an outer peripheral side of the optical disk with a final linear velocity multiplication factor used in the constant angular velocity control when a radial position of the optical beam is outside the border position.

32. (original) The optical disk recording apparatus according to claim 31, further comprising a time information reading section that is provided for reading time information from a wobble of the optical disk, and the system control section calculates a linear velocity of the optical disk based on a rotation speed of the optical disk under the constant angular velocity control and the time information read from the wobble of the optical disk, and performs the constant linear velocity control on the outer peripheral side to execute recording of the data after the calculated linear velocity reaches a predetermined value.

33. (original) An optical disk storing apparatus comprising:

a disk servo that is provided for driving an optical disk to rotate;

an optical pickup that is provided for performing recording of data by irradiating an optical beam on the optical disk and reproducing of data in the form of a

reproduction signal;

an optical power control section that is provided for controlling a power of the optical beam irradiated from the optical pickup;

a signal quality level detection section that is provided for calculating a predetermined parameter concerning a quality level of the reproduction signal based on the reproduction signal reproduced by the optical pickup; and

a system control section that performs a test recording at a first test linear velocity multiplication factor of the optical disk within a variable range of an actual linear velocity multiplication factor used in an actual recording before the actual recording and at a second test linear velocity multiplication factor of the optical disk less than the variable range of the actual linear velocity multiplication factor used in the actual recording before the actual recording, then obtains an appropriate writing power for each of the first and second test linear velocity multiplication factors based on the predetermined parameter concerning the quality level of the reproduction signal obtained in the test recording, sets a characteristic of an appropriate writing power relative to a linear velocity multiplication factor based on the appropriate writing powers obtained for each of the first and second linear velocity multiplication factors, and calculates an appropriate writing power based on the set characteristic in accordance with a linear velocity multiplication factor dependent on a radial position of the writing optical beam, thereby instructing the calculated writing power to the optical power control section in the actual recording.

34. (original) The optical disk recording apparatus according to claim 33, wherein the system control section issues a command for driving the disk servo by a

constant angular velocity control on an inner peripheral side of the optical disk when a radial position of the optical beam is inside a border position, and for driving the disk servo by a constant linear velocity control on an outer peripheral side of the optical disk with a final linear velocity multiplication factor used in the constant angular velocity control when a radial position of the optical beam is outside the border position.

35. (original) The optical disk recording apparatus according to claim 34, further comprising a time information reading section that is provided for reading time information from a wobble of the optical disk, and the system control section calculates a linear velocity of the optical disk based on a rotation speed of the optical disk under the constant angular velocity control and the time information read from the wobble of the optical disk, and performs the constant linear velocity control on the outer peripheral side to execute recording of the data after the calculated linear velocity reaches a predetermined value.

36. (original) An optical disk recording apparatus for performing recording of data at a variable linear velocity multiplication factor in accordance with a radial position of an optical disk, comprising:

a disk servo that is provided for driving an optical disk to rotate;

an optical pickup that is provided for performing recording of data and reproducing of data in the form of a reproduction signal by irradiating the optical disk with an optical beam;

an optical power control section that is provided for controlling a power of the optical beam irradiated from the optical pickup;

a signal quality level detection section that is provided for calculating a

predetermined parameter concerning a quality level of the reproduction signal based on the reproduction signal reproduced by the optical pickup;

a storage section that is provided for storing therein a characteristic of a writing power y of the optical beam in the form of a function y = ax + b with respect to a writing linear velocity multiplication factor x, where the constant a has a fixed value according to a disk type; and

a system control section that performs a test recording of data with a test linear velocity multiplication factor in a predetermined test area before an actual recording of data on the optical disk, obtaining a writing power for the test linear velocity multiplication factor based on the calculated parameter concerning the quality level of the reproduction signal detected in the test recording, calculates a value of the constant b by solving the function y = ax + b with using the results of the test recording, and calculates an appropriate writing power based on the function y = ax + b in accordance with a linear velocity multiplication factor dependent on the radial position of the optical beam, thereby instructing the calculated writing power to the optical power control section in the actual recording.

37. (original) The optical disk recording apparatus according to claim 36, wherein the storage section stores therein a characteristic of a writing power y of an optical beam relative to a linear velocity multiplication factor x in accordance with each type of an optical disk, and the system control section discriminates a type of the optical disk and instructs the optical writing power y of the optical beam based on a characteristic corresponding to the discriminated type of the optical disk among various characteristics of various types stored in the storage section.

38. (original) The optical disk recording apparatus according to claim 36, wherein the system control section issues a command for driving the disk servo by a constant angular velocity control on an inner peripheral side of the optical disk when a radial position of the optical beam is inside a border position, and for driving the disk servo by a constant linear velocity control on an outer peripheral side of the optical disk with a final linear velocity multiplication factor used in the constant angular velocity control when a radial position of the optical beam is outside the border position.

39. (original) The optical disk recording apparatus according to claim 38, further comprising a time information reading section that is provided for reading time information from a wobble of the optical disk, and the system control section calculates a linear velocity of the optical disk based on a rotation speed of the optical disk under the constant angular velocity control and the time information read from the wobble of the optical disk, and performs the constant linear velocity control on the outer peripheral side to execute recording of the data after the calculated linear velocity reaches a predetermined value.

40. (original) An optical disk recording apparatus for performing recording of data at a variable linear velocity multiplication factor in accordance with a radial position of an optical disk, comprising:

a disk servo that is provided for driving an optical disk to rotate;

an optical pickup that is provided for performing recording of data and reproducing of data in the form of a reproduction signal by irradiating the optical disk with an optical beam;

an optical power control section that is provided for controlling a power of the

optical beam irradiated from the optical pickup;

a signal quality level detection section that is provided for calculating a predetermined parameter concerning a quality level of the reproduction signal based on the reproduction signal reproduced by the optical pickup;

a storage section that is provided for storing therein a characteristic of a writing power y of the optical beam in the form of a function $y = ax + b$ with respect to a linear velocity multiplication factor x, where the constant a has a fixed value according to a type of an optical disk; and

a system control section that performs a test recording of data with a plurality of test linear velocity multiplication factors in a predetermined test area before an actual recording of data on the optical disk, obtaining a writing power for each of the test linear velocity multiplication factors based on the calculated parameter concerning the quality level of the reproduction signal detected in the test recording, calculates a value of the constant b by solving the function $y = ax + b$ with using the results of the test recording while minimizing a sum of squares of errors of the obtained writing powers, and calculates an appropriate writing power based on the function $y = ax + b$ in accordance with a linear velocity multiplication factor dependent on the radial position of the optical beam, thereby instructing the calculated appropriate writing power to the optical power control section in the actual recording.

41. (original) The optical disk recording apparatus according to claim 40, wherein the storage section stores therein a characteristic of a writing power y of an optical beam relative to a linear velocity multiplication factor x in accordance with each type of an optical disk, and the system control section discriminates a type of the optical

disk and instructs the optical writing power y of the optical beam based on a characteristic corresponding to the discriminated type of the optical disk among various characteristics of various types stored in the storage section.

42. (original) The optical disk recording apparatus according to claim 41, wherein the system control section issues a command for driving the disk servo by a constant angular velocity control on an inner peripheral side of the optical disk when a radial position of the optical beam is inside a border position, and for driving the disk servo by a constant linear velocity control on an outer peripheral side of the optical disk with a final linear velocity multiplication factor used in the constant angular velocity control when a radial position of the optical beam is outside the border position.

43. (original) The optical disk recording apparatus according to claim 42, further comprising a time information reading section that is provided for reading time information from a wobble of the optical disk, and the system control section calculates a linear velocity of the optical disk based on a rotation speed of the optical disk under the constant angular velocity control and the time information read from the wobble of the optical disk, and performs the constant linear velocity control on the outer peripheral side to execute recording of the data after the calculated linear velocity reaches a predetermined value.

44. (original) An optical disk recording apparatus for performing recording of data at a variable linear velocity multiplication factor in accordance with a radial position of an optical disk, comprising:

a disk servo that is provided for driving an optical disk to rotate;

an optical pickup that is provided for performing recording of data and

reproducing of data in the form of a reproduction signal by irradiating the optical disk with an optical beam;

an optical power control section that is provided for controlling a power of the optical beam irradiated from the optical pickup;

a signal quality level detection section that is provided for calculating a predetermined parameter concerning a quality level of the reproduction signal based on the reproduction signal reproduced by the optical pickup;

a storage section that is provided for storing therein a characteristic of a writing power y of the optical beam in the form of a function $y = ax2 + bx + c$ with respect to a linear velocity multiplication factor x, where the constants a and b have a fixed value according to a type of the optical disk; and

a system control section that performs a test recording of data with a test linear velocity multiplication factor in a predetermined test area before an actual recording of data on the optical disk, obtains a writing power for the test linear velocity multiplication factor based on the calculated parameter concerning the quality level of the reproduction signal detected in the test recording, calculates a value of the constant c by solving the function $y = ax2 + bx + c$ with using the results of the test recording, and calculates an appropriate writing power based on the function $y = ax2 + bx + c$ in accordance with a linear velocity multiplication factor dependent on the radial position of the optical beam, thereby instructing the calculated appropriate writing power to the optical power control section in the actual recording.

45. (original) The optical disk recording apparatus according to claim 44, wherein the storage section stores therein a characteristic of a writing power y of an

optical beam relative to a linear velocity multiplication factor x in accordance with each type of an optical disk, and the system control section discriminates a type of the optical disk and instructs the optical writing power y of the optical beam based on a characteristic corresponding to the discriminated type of the optical disk among various characteristics of various types stored in the storage section.

46. (original) The optical disk recording apparatus according to claim 44, wherein the system control section issues a command for driving the disk servo by a constant angular velocity control on an inner peripheral side of the optical disk when a radial position of the optical beam is inside a border position, and for driving the disk servo by a constant linear velocity control on an outer peripheral side of the optical disk with a final linear velocity multiplication factor used in the constant angular velocity control when a radial position of the optical beam is outside the border position.

47. (original) The optical disk recording apparatus according to claim 46, further comprising a time information reading section that is provided for reading time information from a wobble of the optical disk, and the system control section calculates a linear velocity of the optical disk based on a rotation speed of the optical disk under the constant angular velocity control and the time information read from the wobble of the optical disk, and performs the constant linear velocity control on the outer peripheral side to execute recording of the data after the calculated linear velocity reaches a predetermined value.

48. (original) An optical disk recording apparatus for performing recording of data at a variable linear velocity multiplication factor in accordance with a radial position of an optical disk, comprising:

a disk servo that is provided for driving an optical disk to rotate;

an optical pickup that is provided for performing recording of data and reproducing of data in the form of a reproduction signal by irradiating the optical disk with an optical beam;

an optical power control section that is provided for controlling a power of the optical beam irradiated from the optical pickup;

a signal quality level detection section that is provided for calculating a predetermined parameter concerning a quality level of the reproduction signal based on the reproduction signal reproduced by the optical pickup;

a storage section that is provided for storing therein a characteristic of a writing power y of the optical beam in the form of a function $y = ax2 + bx + c$ with respect to a linear velocity multiplication factor x, where the constants a and b have a fixed value according to a type of the optical disk; and

a system control section that performs a test recording of data with a plurality of test linear velocity multiplication factors in a predetermined test area before an actual recording of data on the optical disk, obtaining a writing power for each of the test linear velocity multiplication factors based on the calculated parameter concerning the quality level of the reproduction signal detected in the test recording, calculates a value of the constant c by solving the function $y = ax2 + bx + c$ with using the results of the test recording while minimizing a sum of squares of errors of the obtained writing powers, and calculates an appropriate writing power based on the function $y = ax2 + bx + c$ in accordance with a linear velocity multiplication factor dependent on the radial position of the optical beam, thereby instructing the calculated appropriate writing power to the

optical power control section in the actual recording.

49. (original) The optical disk recording apparatus according to claim 48, wherein the storage section stores therein a characteristic of a writing power y of an optical beam relative to a linear velocity multiplication factor x in accordance with each type of an optical disk, and the system control section discriminates a type of the optical disk and instructs the optical writing power y of the optical beam based on a characteristic corresponding to the discriminated type of the optical disk among various characteristics of various types stored in the storage section.

50. (original) The optical disk recording apparatus according to claim 48, wherein the system control section issues a command for driving the disk servo by a constant angular velocity control on an inner peripheral side of the optical disk when a radial position of the optical beam is inside a border position, and for driving the disk servo by a constant linear velocity control on an outer peripheral side of the optical disk with a final linear velocity multiplication factor used in the constant angular velocity control when a radial position of the optical beam is outside the border position.

51. (original) The optical disk recording apparatus according to claim 50, further comprising a time information reading section that is provided for reading time information from a wobble of the optical disk, and the system control section calculates a linear velocity of the optical disk based on a rotation speed of the optical disk under the constant angular velocity control and the time information read from the wobble of the optical disk, and performs the constant linear velocity control on the outer peripheral side to execute recording of the data after the calculated linear velocity reaches a predetermined value.

52. (original) A machine readable medium for use in an optical disk recording apparatus having a processor, the medium containing program instructions executable by the processor for causing the optical disk recording apparatus to undergo a method of performing recording of data on an optical disk by controlling an irradiation time (n + k)T of a writing optical beam to form a pit length corresponding to the data, where

T: a time corresponding to a unit pit length;

n: a multiple number (integer number) of the pit length to be formed relative to the unit pit length; and

k: a correction quantity,

wherein the method comprises the steps of:

recording data while varying a linear velocity multiplication factor of the optical disk;

increasing a power of the writing optical beam as the linear velocity multiplication factor rises;

changing a value of the correction quantity k in accordance with the linear velocity multiplication factor when the same is less than a predetermined critical linear velocity multiplication factor; and

fixing a value of the correction quantity k when the linear velocity multiplication factor is not less than the predetermined critical linear velocity multiplication factor.

53. (original) A machine readable medium for use in an optical disk recording apparatus having a processor, the medium containing program instructions executable by the processor for causing the optical disk recording apparatus to undergo a method of performing recording of data with a variable linear velocity multiplication factor in

accordance with a radial position of an irradiation optical beam on an optical disk, wherein the method comprises the steps of:

carrying out a test recording before starting an actual recording at a plurality of test linear velocity multiplication factors lower than a variable range of an actual linear velocity multiplication factor used in the actual recording so as to obtain an appropriate writing power of the irradiation optical beam for each of the test linear velocity multiplication factors;

setting a characteristic of an appropriate writing power in function of the radial position of the irradiation optical beam for the actual linear velocity multiplication factor based on the appropriate writing powers obtained for each of the test linear velocity multiplication factors; and

carrying out the actual recording such that an appropriate writing power of the irradiation optical beam is calculated based on the set characteristic for the actual linear velocity multiplication factor in accordance with the radial position of the irradiation optical beam.

54. (original) A machine readable medium for use in an optical disk recording apparatus having a processor, the medium containing program instructions executable by the processor for causing the optical disk recording apparatus to undergo a method of performing recording of data at a variable linear velocity multiplication factor in accordance with a radial position of an irradiation optical beam on an optical disk, wherein the method comprises the steps of:

carrying out a test recording before starting an actual recording at a first linear velocity multiplication factor within a variable range of an actual linear velocity

multiplication factor used in the actual recording and at a second linear velocity multiplication factor below the variable range of the actual linear velocity multiplication factor so as to obtain an appropriate writing power of the irradiation optical beam for each of the first and second linear velocity multiplication factors;

setting a characteristic of an appropriate writing power in function of the radial position of the irradiation optical beam for the actual linear velocity multiplication factor based on the appropriate writing powers obtained for each of the first and second linear velocity multiplication factors; and

carrying out the actual recording such that an appropriate writing power of the irradiation optical beam is calculated based on the set characteristic for the actual linear velocity multiplication factor in accordance with the radial position of the irradiation optical beam.

55. (original) A machine readable medium for use in an optical disk recording apparatus having a processor, the medium containing program instructions executable by the processor for causing the optical disk recording apparatus to undergo a method of performing recording of data at a variable linear velocity multiplication factor in accordance with a radial position of a irradiation optical beam on an optical disk, wherein the method comprises the steps of:

performing an actual recording with a variable writing power $y = ax + b$ of the irradiation optical beam in accordance with a linear velocity multiplication factor x where the constant a is determined to a fixed value according to a type of the optical disk;

performing a test recording before starting the actual recording such that the test recording is carried out with a test linear velocity multiplication factor to obtain an

appropriate writing power of the irradiation optical beam; and

setting the constant b by solving the function y = ax + b with using the results of the test recording where y = the appropriate writing power and x = the test linear velocity multiplication factor, whereby the actual recording can be performed with an appropriate writing power y calculated based on the function y = ax + b having the set constants a and b.

56. (original) A machine readable medium for use in an optical disk recording apparatus having a processor, the medium containing program instructions executable by the processor for causing the optical disk recording apparatus to undergo a method of performing recording of data at a variable linear velocity multiplication factor in accordance with a radial position of a irradiation optical beam on an optical disk, wherein the method comprises the steps of:

performing an actual recording with a variable writing power y = ax + b of the irradiation optical beam in accordance with a linear velocity multiplication factor x where the constant a is set to a fixed value according to a type of the optical disk;

performing a test recording before starting the actual recording such that the test recording is carried out at a plurality of test linear velocity multiplication factors to obtain an appropriate writing power of the irradiation optical beam at each of the test linear velocity multiplication factors; and

setting the constant b by solving the function y = ax + b with using the results of the test recording while minimizing a sum of squares of errors of the obtained appropriate writing powers, whereby the actual recording can be performed with an appropriate writing power y calculated based on the function y = ax + b having the set

constants a and b.

57. (original) A machine readable medium for use in an optical disk recording apparatus having a processor, the medium containing program instructions executable by the processor for causing the optical disk recording apparatus to undergo a method of performing recording of data at a variable linear velocity multiplication factor in accordance with a radial position of a irradiation optical beam on an optical disk, wherein the method comprises the steps of:

performing an actual recording with a variable writing power y = ax2 + bx + c of the irradiation optical beam in accordance with a linear velocity multiplication factor x where the constants a and b are determined to a fixed value according to a type of the optical disk;

performing a test recording before starting the actual recording such that the test recording is carried out with a test linear velocity multiplication factor to obtain an appropriate writing power of the irradiation optical beam; and

setting the constant c by solving the function y = ax2 + bx + c with using the results of the test recording where y = the obtained appropriate writing power and x = the test linear velocity multiplication factor, whereby the actual recording can be performed with an appropriate writing power y calculated based on the function y = ax2 + bx + c having the set constants a, b and c.

58. (original) A machine readable medium for use in an optical disk recording apparatus having a processor, the medium containing program instructions executable by the processor for causing the optical disk recording apparatus to undergo a method of performing recording of data at a variable linear velocity multiplication factor in

accordance with a radial position of an irradiation optical beam on an optical disk, wherein the method comprises the steps of:

performing an actual recording with a variable writing power y = ax2 + bx + c of the irradiation optical beam in accordance with a linear velocity multiplication factor x of the optical disk where the constants a and b are set to a fixed value according to a type of the optical disk;

performing a test recording before starting the actual recording such that the test recording is carried out at a plurality of test linear velocity multiplication factors to obtain an appropriate writing power of the irradiation optical beam at each of the test linear velocity multiplication factors; and

setting the constant c by solving the function y = ax2 + bx + c with using the results of the test recording while minimizing a sum of squares of errors of the obtained appropriate writing powers, whereby the actual recording can be performed with an appropriate writing power y calculated based on the function y = ax2 + bx + c having the set constants a, b and c.

59. (new) An optical disk recording method for performing recording on an optical disk by controlling a recording optical beam irradiation time of a pit length to be formed to (n + k) T,

where T: a time corresponding to a unit pit length;

n: a multiple number (natural number) of said pit length to be formed relative to said unit pit length; and

k: a correction quantity

wherein in case of recording with a variable linear velocity multiplication factor, a

recording power of said optical beam is increased as a recording linear velocity multiplication factor is heightened,

characterized in that, with a predetermined linear velocity multiplication factor as a boundary, a value of said correction quantity k is changed in accordance with a linear velocity multiplication factor in case of less than said predetermined linear velocity multiplication factor, while a value of said correction quantity k is fixed even if the linear velocity multiplication factor varies in case of not less than said predetermined linear velocity multiplication factor, thereby performing recording.

60. (new) The optical disk recording method according to claim 59, wherein said linear velocity multiplication factor as a boundary is a multiplication factor not less than an octuple speed.

61. (new) The optical disk recording method according to claim 59, wherein recording is performed with a variable linear velocity multiplication factor in accordance with a position on said optical disk in a radial direction, and said linear velocity multiplication factor as a boundary is a linear velocity multiplication factor in the middle of a variable range of said linear velocity multiplication factor.

62. (new) The optical disk recording method according to claim 61, wherein linear velocity multiplication factor variable control recording is executed according to a position on said optical disk in the radial direction by controlling said optical disk by constant angular velocity control.

63. (new) The optical disk recording method according to claim 62, wherein a linear velocity at each point in time is calculated based on a number of revolutions of said constant angular velocity control and time information read from a wobble of said

optical disk, and recording is performed by performing constant linear velocity control on the peripheral side and after attainment of said linear velocity to a predetermined value.

64. (new) An optical disk recording apparatus comprising:

a disk servo for driving an optical disk to rotate;

an optical pickup for performing recording and reproduction by irradiating said optical disk with an optical beam;

an optical power control portion for controlling a power of an optical beam outgoing from said optical pickup;

a strategy portion for controlling an irradiation time of a recording optical beam in accordance with a pit length to be formed to (n + k) T,

where T: a time corresponding to a unit pit length,

n: a multiple number (natural number) of said pit length to be formed relative to said unit pit length, and

k: a correction quantity;

a storage portion for storing therein a characteristic that a recording power of said optical beam is increased as a recording linear velocity multiplication factor is heightened as a characteristic of a recording power of said optical beam relative a recording linear velocity multiplication factor; and

a system control portion which directs a recording power of an optical beam to said optical power control portion based on a characteristic of a recording power of an optical beam stored in said storage potion in accordance with a recording linear velocity multiplication factor at the time of recording on said optical disk,

the apparatus characterized in that:

the storage portion stores therein a characteristic that a value of said correction quantity k varies in accordance with a linear velocity multiplication factor in case of less than a predetermined linear velocity multiplication factor as a boundary and a characteristic that a value of said correction quantity k is fixed in case of not less than said velocity multiplication factor as a characteristic of said correction quantity k relative to a recording linear velocity multiplication factor, and

the system control portion performs control to direct a correction quality k to said strategy portion based on the characteristic of said correction quantity stored in said storage portion.

65. (new) The optical disk recording apparatus according to claim 64, wherein said storage portion stores therein a characteristic of said correction quantity k relative to said recording linear velocity multiplication factor in accordance with each disk type; and

said system control portion discriminates a disk type and executes control for directing said correction quantity k to said strategy portion based on a corresponding characteristic among characteristics of respective correction quantities k stored in said storage portion.

66. (new) The optical disk recording apparatus according to claim 64, wherein said system control portion issues a command for driving said disk servo with an appropriate position on said optical disk in the radial direction as a boundary by constant angular velocity control on an inner peripheral side thereof and for driving the same on an outer peripheral side by constant linear velocity with a linear velocity

multiplication factor final value in said constant angular velocity control.

67. (new) The optical disk recording apparatus according to claim 66, further comprising a time information reading portion for reading time information from a wobble of said optical disk,

wherein said system control portion calculates a linear velocity at each point in time based on a number of revolutions of said constant angular velocity control and said time information read from said wobble of said optical disk, and performs constant linear velocity control on said outer peripheral side to execute recording on and after attainment of said linear velocity to a predetermined value.